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Preface

Preface_wo_03_15_2004_m

Delete all but the first paragraph and add the following:

The Forest Service, US Department of Agriculture has adopted FP-03 for construction of National Forest System Roads.

101 - Terms, Format, and Definitions

101.00_nat_us_07_25_2005

101.01_nat_us_01_22_2009

101.01 Meaning of Terms

Delete all references to the TAR (Transportation Acquisition Regulations) in the specifications.

101.03_nat_us_06_16_2006

101.3 Abbreviations.

Add the following to (a) Acronyms:

AFPA	American Forest and Paper Association
MSHA	Mine Safety and Health Administration
NIST	National Institute of Standards and Technology
NESC	National Electrical Safety Code
WCLIB	West Coast Lumber Inspection Bureau

.

Add the following to (b) SI symbols:

mp	Milepost
ppm	Part Per Million

101.04_nat_us_03_29_2007

101.4 Definitions.

Delete the following definitions and substitute the following:

Bid Schedule--The Schedule of Items.

Bridge--No definition.

Contractor--The individual or legal entity contracting with the Government for performance of prescribed work. In a timber sale contract, the contractor is the “purchaser”.

Culvert--No definition.

Right-of-Way--A general term denoting (1) the privilege to pass over land in some particular line (including easement, lease, permit, or license to occupy, use, or traverse public or private lands), or (2) Real property necessary for the project, including roadway, buffer areas, access, and drainage areas.

Add the following:

Adjustment in Contract Price--“Equitable adjustment,” as used in the Federal Acquisition Regulations, or “construction cost adjustment,” as used in the Timber Sale Contract, as applicable.

Change--“Change” means “change order” as used in the Federal Acquisition Regulations, or “design change” as used in the Timber Sale Contract.

Design Quantity--“Design quantity” is a Forest Service method of measurement from the FS-96 *Forest Service Specifications for the Construction of Roads and Bridges*. Under these FP specifications this term is replaced by the term “Contract Quantities”.

Forest Service--The United States of America, acting through the Forest Service, U.S. Department of Agriculture.

Neat Line--A line defining the proposed or specified limits of an excavation or structure.

Pioneer Road--Temporary construction access built along the route of the project.

Purchaser--The individual, partnership, joint venture, or corporation contracting with the Government under the terms of a Timber Sale Contract and acting independently or through agents, employees, or subcontractors.

Protected Streamcourse--A drainage shown on the plans or timber sale area map that requires designated mitigation measures.

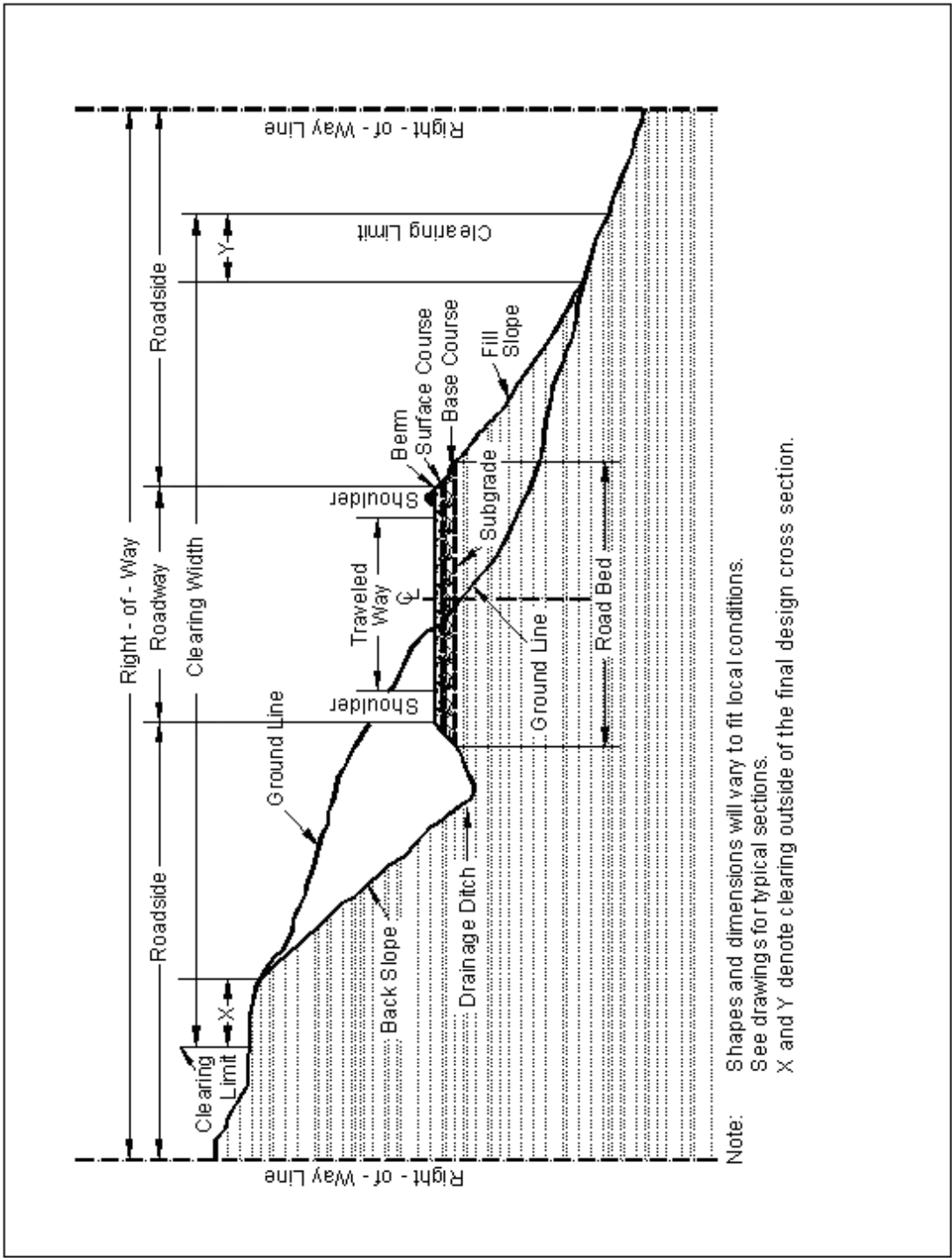
Road Order--An order affecting and controlling traffic on roads under Forest Service jurisdiction. Road Orders are issued by a designated Forest Officer under the authorities of 36 CFR, part 260.

Schedule of Items--A schedule in the contract that contains a listing and description of construction items, quantities, units of measure, unit price, and amount.

Utilization Standards--The minimum size and percent soundness of trees described in the specifications to determine merchantable timber.

Add Figure 101-1—Illustration of road structure terms:

Figure 101-1—Illustration of road structure terms.



Sale Name: Sutcliffe SBA

102 - Bid, Award, and Execution of Contract

102.00_nat_us_02_16_2005

102 Bid, Award, and Execution of Contract

Delete Section 102 in its entirety.

103 - Scope of Work

103.00_nat_us_02_16_2005

Deletions

Delete all but subsection 103.01 Intent of Contract.

104 - Control of Work

104.00_nat_us_06_16_2006

Deletions

Delete Sections 104.01, 104.02, and 104.04.

104.06_nat_us_02_17_2005

Add the following subsection:

104.06 Use of Roads by Contractor

The Contractor is authorized to use roads under the jurisdiction of the Forest Service for all activities necessary to complete this contract, subject to the limitations and authorizations designated in the Road Order(s) or described in the contract, when such use will not damage the roads or national forest resources, and when traffic can be accommodated safely.

105 - Control of Material

105.02_nat_us_01_18_2007

105.02 Material Sources.

105.02(a) Government-provided sources.

Add the following:

Comply with the requirements of 30 CFR 56, subparts B and H. Use all suitable material for aggregate regardless of size unless otherwise designated. When required, re-establish vegetation in disturbed areas according to section 625.

105.05_nat_us_05_12_2004

105.05 Use of Material Found in the Work.

Delete 105.05 (a) and (b) and the last sentence of the second paragraph and substitute the following:

Materials produced or processed from Government lands in excess of the quantities required for performance of this contract are the property of the Government. The Government is not obligated to make reimbursement for the cost of producing these materials.

106 - Acceptance of Work

106.07_nat_us_05_11_2004

106.07 Delete

Delete subsection 106.07.

107 - Legal Relations and Responsibility to the Public

107.05_nat_us_05_11_2004

107.05 Responsibility for Damage Claims.

Delete the entire subsection.

107.06_nat_us_06_16_2006

107.06 Contractor's Responsibility for Work.

Delete the following from the first paragraph.

“except as provided in Subsection 106.07”.

107.09_nat_us_06_16_2006

107.9 Legal Relationship of the Parties.

Delete the entire subsection.

107.10_nat_us_06_16_2006

107.10 Environmental Protection.

Add the following:

Design and locate equipment repair shops, stationary refueling sites, or other facilities to minimize the potential and impacts of hazardous material spills on Government land. **Refueling, servicing and fuel containment storage areas shall be at least 100 ft. from watercourses with a low risk of discharge.**

Before beginning any work, submit a Hazardous Spill Plan. List actions to be taken in the event of a spill. Incorporate preventive measures to be taken, such as the location of mobile refueling facilities, storage and handling of hazardous materials, and similar information. Immediately notify the CO of all hazardous material spills. Provide a written narrative report form no later than 24 hours after the initial report and include the following:

- Description of the item spilled (including identity, quantity, manifest number, and other identifying information).
- Whether amount spilled is EPA or state reportable, and if so whether it was reported, and to whom.
- Exact time and location of spill including a description of the area involved.
- Containment procedures.
- Summary of any communications the Contractor had with news media, Federal, state and local regulatory agencies and officials, or Forest Service officials.

- Description of clean-up procedures employed or to be employed at the site including final disposition and disposal location of spill residue.

When available provide copies of all spill related clean up and closure documentation and correspondence from regulatory agencies.

The Contractor is solely responsible for all spills or leaks that occur during the performance of this contract. Clean up spills or leaks to the satisfaction of the Forest Service and in a manner that complies with Federal, state, and local laws and regulations.

107.10_05_us_05_04_2007

107.2 Protection and Restoration of Property and Landscape

Add the following:

Meet the requirements of sections 10, 11, and 12.2 in their entirety of “R5 FSH 2509.22 - SOIL AND WATER CONSERVATION HANDBOOK CHAPTER 10 - WATER QUALITY MANAGEMENT HANDBOOK “ dated December 5, 2011.

The applicable sections of the Klamath National Forest Wet Weather Operations Package shall be followed (see attached copy).

WET WEATHER OPERATIONS PACKAGE

Klamath National Forest

September 14, 1998

&

April, 1999

Includes:

- [1] Wet Weather Operation Standards [09-14-98]**
- [2] Field Guide** – for use with Wet Weather Operation Standards
- [3] BMP “Yardsticks” and Checklist** - for use with Wet Weather Operation Standards
- [4] Nature & Scope of Reporting Needs**
- [5] BMP-WWO Reporting Form**

_____TIMBER SALE

Contract Number 05-_____

WET WEATHER OPERATION STANDARDS
(09/14/98)

Timber Sale Contract (TSC) Provision B5.12 - Use of Roads by Purchaser, states in part "...Purchaser is authorized to use existing National Forest roads...when such use will not cause damage to the roads or National Forest resources and when hauling can be done safely." Provision B6.31 - Operating Schedule states in part "Subject to B6.6 and when the requirements of B6.65 are met, Purchaser's operations may be conducted outside Normal Operating Season."

Logging operations may be conducted outside the Normal Operating Season (NOS), however, certain requirements must be met in order to have operations proceed during this period. Compliance with pertinent Best Management Practices (BMPs) by the Purchaser is necessary to meet water quality requirements as agreed to between the State of California and the US Forest Service. The following standards are intended to further clarify Timber Sale Contract requirements by providing specific criteria for conducting sale operations during wet weather conditions and to facilitate consistent implementation across the Klamath National Forest.

The following guidelines are to be used to determine if conditions are favorable for wet weather/winter operations and to provide guidance as to when conditions warrant suspension of operations, when operations may begin or resume, or when and what remedies may be appropriate. These guidelines also apply within the Normal Operating Season (NOS) when prolonged periods of wet weather are encountered. These standards provide for additional measures that are needed to protect the transportation system, maintain water quality, and preserve the soil resource.

A. General Guidelines:

* Operations will be continually monitored by the Purchaser and the Forest Service, including: sale administration personnel, purchaser representatives, and resource specialists. Conditions may change as operations progress during the wet season. If detrimental effects to the transportation system, water quality, or soil resources are encountered by either party, immediate notification of designated sale administrative personnel by either the Purchaser or Forest Service shall occur. The Purchaser and Forest Service will work together to develop actions necessary to alleviate these effects.

* BMP guidelines dictate that no sediment/contaminant flow into stream courses from any facility used by the Purchaser, including B. Roads, C. Skid Trails, Cableways, or Harvest Areas, D. Landings, and E. Fueling Locations, will be permitted at any time.

B. Roads:

General - Hauling/Access Use:

* Required road work for prehaul must be accomplished prior to the wet season or periods of precipitation. Saturated road surfaces should not be graded. At least 2" of snow should remain on the road surface after snow plowing. Road surfaces must be at a standard and maintenance level that will support the impacts of wet weather operations. This includes the following:

1) Actions that augment BMP compliance:

Wet Conditions

* Drainage structures and erosion/sediment prevention actions will be in place and functioning prior to expected precipitation events.

* Roads will be properly graded and ditched or outsloped.

* Portions of roads that lie within Streamside Management Zones (SMZs) and road locations where eroded material is likely to enter channels will be rocked to Forest Service specifications and geotextile fabric used when appropriate, unless otherwise agreed, with input from a resource specialist and an engineer.

* Operations will be scheduled to use roads in order to avoid the risk of rutting during "precipitation events."

* By agreement, use of the variable tire pressure option can be used to reduce surface replacement and will reduce purchaser road maintenance costs.

Snow Conditions

* Snow will be removed without disturbing the road surface, cut bank, fill slope, or drainage structures. No soil or aggregate should be intermixed with the sidecast snow during plowing or grading. At least 2" of snow should remain on the road surface after snow plowing.

* Snow berms must be breached, except in sensitive areas, to allow proper road drainage. These outlets must be spaced so as not to concentrate road surface flows (usually spaced no more than 200 feet apart). Erosion control structures (straw bales or filter fence) may be required at the outlets to collect road generated sediment.

Frozen Conditions

* If the road surface freezes, the road surface segments must remain completely frozen and must be able to support the weight of any vehicle that will be driven on it. If the road thaws, see below...

* When any part of the active road length thaws and mitigations, such as rocking, cannot be implemented to ensure water quality protection, the road will not be used. This will preclude the use of the road by all vehicles (including administrative) unless the activity can be restricted to that portion of the road that remains frozen.

2) BMP indicators that operations should be curtailed and/or corrective action implemented:

CULVERTS:

[1] Sediment and/or debris is blocking 30% of inlet or outlet.

[2] More than 10% of the flow passes beneath or around culvert, or noticeable piping erosion evident.

EROSION:

[3] Scour and/or sediment deposition evident, and extending more than 20 feet below outlet of cross drain (e.g., culvert, dip, waterbar).

[4] Scour &/or sediment movement into SMZ or drainageway from road surface, cut slope, or fill slope.

[5] Material sidecast within 25 feet of a channel, ditch or drainageway, or onto slopes vegetated for erosion control.

PONDING:

[6] Ponding present on road surface that is causing fill subsidence or otherwise threatening integrity of fill.

RUTS/RILLS:

[7] More than 10% of road segment length has rills or ruts more than 2 inches deep and 20 feet in length which continue off road surface.

[8] Ruts formed that can channel water past erosion control structures.

[9] Numerous rills present at stream crossing (>1 rill per lineal 5 ft), apparently active or enlarging, evidence of some sediment delivery to stream.

3) Operating Requirements & Remedies:

* If more than 10 percent of the road segment length is rutted 2 inches in depth or greater, purchasers use of the road will be suspended. (Percentage will be determined in one mile increments if road is longer than one mile). If the road is to remain closed, it must have a barrier of some type installed to keep out all vehicular traffic and signed to keep traffic off road surface.

* If the roadway dries and can support vehicles without causing rutting, soil displacement, damage to drainage structures, and with no off-site sediment movement, it can be used. If not, it should remain unused.

* Roads damaged by Purchaser's Operations and associated damage will be repaired at the Purchaser's expense. A remedy plan will be prepared and implemented. Repair work shall be accomplished immediately when conditions are such that additional damage to the resources will not occur or when designated by the Forest Service.

Native Surfaced Roads and Other Roads Identified for Special Hauling Requirements

* The native surfaced roads and other roads listed below are located in sensitive soils that are prone to road surface damage during wet weather use. There shall be no log hauling on these roads during precipitation events. The timber sale operator shall allow an adequate drying period after a rain occurrence prior to resumption of hauling (normally 1 day depending on soil type and/or as determined by Purchaser and Forest Service Rep.).

<u>Road Number</u>	<u>Length (miles)</u>	<u>Termini - Termini</u>
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Rocking Roads

* Locations where road rocking is required to harden the road surface for wet weather haul will be designated in writing and flagged on-the-ground by the Engineering Rep. or Sale Administrator. Minimum depth of rock that meets engineering specifications will be established in writing and inspected by the Forest Service prior to use of the road for hauling outside the NOS.

C. Skid Trails/Cableways/Harvest Areas:

Skid trails will be flagged by the Purchaser and approved by the Forest Service in **advance** of falling.

1) Actions that augment BMP compliance:

General

* No more than 15% of the activity area (includes temporary roads, landings, skid trails, and cableways [cable corridors]) should be subjected to detrimental ground-disturbing activities. Ground-disturbing activities produce adverse changes in soil porosity (compaction), soil cover, and soil organic matter.

Snow/Frozen Conditions

* Snow can act as a cushion to protect wet soils. Unless otherwise agreed, within the operating area, a minimum of 6 inches of machine compacted snow with a minimum water content of 2 inches is required for over-the-snow logging or the soil should be frozen to a depth of 6 inches for logging operations to occur (frozen soil occurs primarily on the Goosenest District). When the snow depth approaches this minimum, snow conditions must be monitored on a daily basis to verify snow depth is sufficient to start or continue operations. Approval to operate on snow less than indicated above must include an evaluation by a soil scientist or hydrologist. At least 90% of the skidding surfaces must meet the above snow cover standard at all times. If snow cover falls below 90%, see section 2) below for "bare ground" standards.

Wet Conditions

Skyline - No Specified pre-conditions.

Cut-to-Length System - Processing of material on the designated skid trails by a harvester may occur when soils are dry to a depth of 4 inches. Limit harvester to 1 or 2 passes over the same piece of ground. The forwarder will stay on designated skid trails covered with a minimum of 6 inches of slash.

Feller/Buncher System - Movement of material to the designated skid trails by a track laying feller/buncher may occur when soils are dry to a depth 4 inches. Feller/buncher will be limited to 1 or 2 passes over the same piece of ground. Skidding equipment will stay on designated skid trails until soils are dry to a depth of 10 inches.

Traditional Tractor Logging - Skidding may occur by conventional high-ground-pressure equipment when soils are dry to a depth of 4 inches. Equipment is restricted to the designated skid trails. Endlining will be used to move material to the designated skid trails until soils are dry to a depth of 10 inches. Equipment

may, by agreement, leave designated skid trails when soils are dry to a depth of 10 inches.

2) BMP indicators that operations should be curtailed and/or corrective actions implemented:

[10] More than 20% of skid trail or cableway surface lengths have rills present that are over 2 inches deep and more than 10 feet in length.

[11] More than 10% of skid trail surface length has ruts greater than 2 inches deep.

[12] Rills and/or sediment deposition extends more than 20 feet below waterbar outlet.

[13] More than 10% of waterbars fail to divert flow off skid trails or cableways.

[14] Erosion within or sediment movement into SMZ.

[15] Presence of gullies (erosional features greater than 4" deep and 6" wide).

3) Operating Requirements & Remedies:

* Skid trails, cableways and harvest areas damaged by Purchaser's Operations and associated damage will be repaired at the Purchaser's expense. A remedy plan will be prepared and implemented. Repair work shall be accomplished immediately when conditions are such that additional damage to the resources will not occur or when designated by the Forest Service. See the Wet Weather Operation Field Guide for a list of potential remedies.

D. Landings:

Landings will be agreed to by Purchaser and designated sale administrative personnel prior to their construction and/or use. Landings will not be located within SMZs or Riparian Reserves unless a resource specialist (hydrologist, geologist, fisheries biologist) is consulted.

1) Actions that augment BMP compliance:

* Landings will be constructed to ensure proper drainage, compaction and stability. Landings will be monitored to ensure that drainage is effective. For example, landings will not create a depression which cannot be properly drained; upslope runoff will be diverted, to an appropriate location, around the activity.

* If rocking is required for wet weather operations, landings should be rocked before the surface becomes saturated.

* Landings should be identified well in advance of logging activities. This would allow construction be complete within the NOS. But if unavoidable and as a preventative measure, all landing fill slopes constructed outside of the Normal Operating Period should be mulched. Mulch material can consist of wood chips, certified weed-free straw, or any other Forest Service approved material which will provide slope protection against erosion and rilling. In addition, downslope perimeter erosion control will be required if a potential threat to water quality exists as determined by an earth scientist.

* The use of a heel boom loader may be required to minimize landing size and reduce excavation of the site.

2) BMP indicators that operations should be curtailed and/or corrective actions implemented:

[16] Rills (greater than 1/2" deep and 10' in length) and/or sediment deposition has extended more than 20 feet below the toe of the landing fill slope.

[17] More than 1 cubic yard of material (from erosion or slope failure) has moved into SMZ.

3) Operating Requirements & Remedies:

* Landings damaged by Purchaser's Operations and associated damage will be repaired at the Purchaser's expense. Repair work shall be accomplished immediately when conditions are such that additional damage to the resources will not occur or when designated by the Forest Service.

E. Fueling Sites:

1) Action that augment BMP compliance:

* Purchaser shall take additional appropriate measures documented in a wet weather fuel storage plan to prevent any oil or oil product spill from entering any stream or drainageway.

2) BMP indicators that operations should be curtailed and/or corrective measures implemented:

[18] Evidence of more than 10 gallons of fuel or oil products outside bermed containment area.

3) Operating Requirements & Remedies:

* Fueling sites damaged by Purchaser's Operations and associated damage will be repaired at the Purchaser's expense. Repair work shall be accomplished immediately when conditions are such that additional damage to the resources will not occur or when designated by the Forest Service.

Forest Service retains the authority to suspend any or all of Purchaser's operations as needed to protect resources.

FIELD GUIDE

For Use with

WET WEATHER OPERATION STANDARDS

The following guide was written to supplement the Klamath National Forest's "Wet Weather Operation Standards" (WWOS). It was designed to provide specific working definitions, practical explanations, and discussions of terms and concepts appearing in WWOS. This guide uses definitions from many sources, but draws primarily from Forest Service Region 5 Best Management Practices (BMP), BMP Evaluation Program handbook, Timber Sale Contract (TSC) language (B & C Provisions), and the Klamath National Forest's Land and Resource Management Plan (LRMP).

WET WEATHER

Various phrases such as "wet season", "periods of precipitation", "prior to expected precipitation events", "during precipitation events", "preceding expected seasonal periods of precipitation or runoff", "soil or surface saturation", and "Normal Operating Season" (NOS) are used in the WWOS and standard TSCs. These phrases refer to two distinct types of activities: (1) **erosion control**, including prehaul road/landing work (typically grading, drainage maintenance or installation, or rock surfacing) and installation of non-road erosion control measures (such as drainage structures, mulching, etc.), and (2) **logging activities**, including skidding (&/or yarding) and hauling.

NOS beginning and ending dates for each timber sale are specified in the TSC. "Wet season" and "seasonal periods of precipitation or runoff" therefore refer to that period of the year outside the NOS.

"Periods of precipitation" and "..precipitation events" can occur at any time of the year and are defined as follows: precipitation amounts in intensity and/or duration that cause runoff. In other words, precipitation amounts that exceed the moisture-bearing capacity of the soil or conditions of over-saturation producing runoff of excess moisture. This definition assumes antecedent saturation conditions, either from previous "events" or the early parts of the current "event."

"Prior to expected..." or "preceding expected..." can not be clearly defined. For this initial field guide version, it is when the National Weather Service (or other accepted source) predicts a 50% or higher chance of measurable precipitation for the local area. Discretion should be exercised by the Purchaser &/or Sale Administrator in order to keep this provision reasonable. For example, the weather report should predict more than one day of unsettled weather (summer thunderstorms) and erosion control measures should be prioritized so that key structures are constructed/installed first.

Erosion control work should be current "prior to" or "preceding" an expected precipitation event. All erosion control work shall be current by September 15. After September 15th, erosion control work should be done as promptly as practical. Drainage structures are difficult to construct when landings, temporary roads, skid trails, cable corridors, etc. are wet or have snow on them. If placement of a rock surface is required for wet weather hauling, it must be done before the surface becomes saturated. Within the NOS, key erosion control work should be done if significant wet weather is anticipated (see paragraph above).

Logging activities can occur outside of the NOS if: (1) conditions are favorable, and (2) erosion control work is current. These conditions (with restrictions and requirements) are delineated in various paragraphs and sections of the WWOS.

DRY SOIL - DRY ROAD

After a "precipitation event" or at the beginning of the season (NOS), it is necessary to determine when conditions are dry enough for logging activities to resume or commence. Local variations in a number of parameters, including soil type, hydro-geomorphology, and road composition, dictate that certain areas or road segments may dry out sooner than others. Therefore, discretion is required and blanket determinations can rarely be made. The term "soil" is used sensu lato and includes any surface material.

Dry Soils: Skidding during very wet soil conditions will cause rutting; under moderately wet condition, soil compaction will result. Puddling in ruts indicates that soil compaction and damage has probably already occurred.

To determine dry soil, a field soil moisture test will be conducted as follows:

- (1) On skid trails, at a depth of 4", take 2 or 3 samples along the length of each skid trail to be used. Sample points should be chosen to represent typical moisture conditions for each skid trail. Off skid trails, at a depth of 10", take 2 or 3 samples representative of moisture conditions within the unit.
- (2) Form a ball by squeezing the soil sample firmly in the hand. The soil is considered dry enough to begin skidding operations if the sample cannot be molded into a ball or falls apart when rolled in the palm of the hand. If the ball holds its shape while rolled, the soil is too wet for skidding activities.

Dry Roads: Roads must be determined to be suited for wet weather hauling and general use after "precipitation events" and at the beginning of the NOS. Factors to consider include : surface & sub-surface material, soil type (native-surfaced), drainage condition, maintenance condition, stream crossings (& sensitivity thereof), and volume to be hauled. Subjective judgment must be used and applied to local road segments. Possible remedies to specific problems are shown in Table 1, below.

In general, if the roadway dries and can support vehicles without causing rutting, soil displacement, damage to drainage structures, and with no off-site sediment movement, it can be used. If not, it should remain unused.

ROADS

Three terms are used to describe road degradation: 'ruts', 'rills', and 'gullies'. They are defined as follows:

ruts - sunken tracks or grooves left by the passage of vehicles and expressed as vertically and/or laterally displaced road material,

rills - depressions in the surface caused by the washing away of material by running water,

gullies - large rills, larger than 6" wide and 4" deep.

Road degradation is a function of many factors. Dominant factors are:

- [1] Traffic - both excess weight &/or high frequency (high use)
- [2] Road composition & maintenance - weak sub-base, base, or surface, &/or poor drainage
- [3] Moisture - antecedent (saturation) & event (significant precipitation)

Most **rutting** is a natural occurrence, the result of normal road use. "Wear grooves" develop in all roads, regardless of usage or moisture conditions. The factors listed above influence the speed and degree of development. However, some rutting can be viewed as a structural failure of the road surface. In other words, load of individual vehicles (e.g. logging trucks) or cumulative loads of many vehicles (heavy traffic) may exceed mechanical strength of road materials, usually when weakened by excess moisture. This type of rutting commonly occurs with native-surfaced roads or at "problem" spots along rock-surfaced roads. 'Rutting' should NOT be confused with 'rilling' or 'gullying', which are erosional processes.

Road surface rutting raises a "yellow flag" warning. The road surface has degraded, but by definition, impacts to water quality have NOT yet occurred. Rutting indicates that the road is in need of maintenance and/or repair. "Wear grooves" suggest routine maintenance, such as grading, is required. "Structural failure" ruts indicate repairs and/or reconstruction is needed to road surface (e.g., rocking) or drainage system (e.g., culvert installation at wet spot). If ruts are not fixed, then future rilling is likely. Rutting calls for immediate mitigation, road closure is but one option (Table 1, below). For example, ruts could be fixed by grading and/or rocking so that they do not channelize water, which leads to erosion (rilling & gullying).

Rills and **gullies** are defined as the removal of road material by erosional processes. Rills and gullies are "red flags", suggesting adverse impacts to water quality are likely to occur.

The follow table indicates possible remedies to specific problems:

Table 1. 'Rutting' means:

Factor:	Loads too heavy, too frequent &/or	Road too weak &/or	Too wet
Solutions:	Reduce loads/freq. by: reducing # of daily loads no logging trucks, light vehicles only reduce tire pressures road closure	Strengthen (fix) road by: if drying trend, grade rock, fix drainage, or other "fix-it" measures road freezes road closure	Water proof by: if drying trend, grade surface &/or drainage fix road freezes road closure

STREAMSIDE MANAGEMENT ZONES (SMZ)

BMP documents, TSCs, and the Klamath LRMP use different terms for essentially the same concept: That is, the designation and protection of streams and their buffer zones. BMPs and the BMP Evaluation Program use the term "Streamside Management Zones." TSCs use "Streamcourse Protection" (e.g., B6.5). The Klamath LRMP (& the Northwest Forest Plan ROD) use the term "Riparian Reserves." "SMZ" is used in the WWOS since the WWOS are based primarily on BMPs, implemented in order to protect water quality. On the Klamath National Forest, SMZs are approximately equivalent to hydrologically-defined Riparian Reserves.

"Streamcourses", designated for special protection under B6.5 (&C6.5), are shown as line features on the Sale Area Maps for individual timber sales. Each of the three sources above use different buffer widths for protection zones. Timber sales offered after signing of the Klamath LRMP & the Northwest Forest Plan ROD (1994) defer to Riparian Reserve "interim ROD buffer widths", unless these widths have been modified by a subsequent Watershed Analysis and NEPA process.

BMP "YARDSTICKS" and CHECKLIST

For Use with

WET WEATHER OPERATIONS STANDARDS

The following BMP (Best Management Practices) quantitative guidelines are excerpted from the WWOS (Wet Weather Operations Standards). They provide measurable "yardsticks" to assess whether (or not) sites meet BMPs. This document was designed to provide Sale Administrators and Resource people with an easy to use checklist to utilize in the field.

In general, we are looking for evidence of erosion, or indications that erosion MIGHT take place. We should be "proactive" in this regard and NOT wait until the standards listed below are exceeded, but try to anticipate problems or conditions that could lead to erosion.

Numbers in square brackets ([1]) refer to lines in the WWOS document. Alpha-numeric codes in parentheses [(E09)] refer to BMP Evaluation Program forms.

BMP indicators that operations should be curtailed and/or corrective action implemented:

ROADS

Culverts (or cross drains):

[1] Sediment and/or debris is blocking 30% of inlet or outlet. (E09)

[2] More than 10% of the flow to pass beneath or around culvert, or noticeable piping erosion evident.
(E09)

[3] Scour and/or sediment deposition evident, and extending more than 20 feet below outlet of cross
drain (e.g., culvert, dip, waterbar). (E08)

Erosion of road material:

[4] Scour &/or sediment movement into SMZ or drainageway from road surface, cut slope, or fill slope. (E08, E20)

[5] Material sidecast within 25 feet of a channel, ditch or drainageway, or onto slopes vegetated for
erosion control. (E11)

Ponding:

[6] Ponding present on road surface that is causing fill subsidence or otherwise threatening integrity of fill. (E09)

Ruts/rills:

[7] More than 10% of road segment length has rills or ruts more than 2 inches deep and 20 feet in length which continue off road surface. (E08,E20)

[8] Ruts formed that can channel water past erosion control structures.

[9] Numerous rills present at stream crossing (>1 rill per lineal 5 ft), apparently active or enlarging, evidence of some sediment delivery to stream. (E09)

SKID TRAILS, CABLEWAYS, & HARVEST AREAS

[10] More than 20% of skid trail or cableway surface lengths have rills present that are over 2 inches deep and more than 10 feet in length. (T02)

[11] More than 10% of skid trail surface length has ruts greater than 2 inches deep. (T02)

[12] Rills and/or sediment deposition extends more than 20 feet below waterbar outlet. (T02)

[13] More than 10% of waterbars fail to divert flow off skid trails or cableways. (T02)

[14] Erosion within or sediment movement into SMZ. (T02, T05)

[15] Presence of gullies (erosional features greater than 4" deep and 6" wide).

LANDINGS

[16] Rills (greater than 1/2" deep and 10' in length) and/or sediment deposition has extended more than 20 feet below the toe of the landing fill (from T04).

[17] More than 1 cubic yard of material (from erosion or slope failure) has moved into SMZ. (T04)

FUELING SITES

[18] Evidence of more than 10 gallons of fuel or oil products outside bermed containment area.
(E12)

**BMP-WWO Monitoring and Evaluation
Guidelines for Timber Administration Personnel**

**NATURE & SCOPE OF REPORTING NEEDS
April, 1999**

Objectives: of this reporting effort are to document monitoring efforts that evaluate compliance with Wet Weather Operation Standards (WWOS). In other words, do logging activities conducted during wet weather conditions meet measurable guidelines specified in the WWOS ? Results of this reporting will be used internally (e.g., LRMP Monitoring, Adaptive Management) and externally with regulatory agencies (e.g., Water Quality Control Board, National Marine Fisheries Service) and other public individuals & groups.

Reporting needs:

[1] A seasonal summary of logging activities conducted outside the Normal Operating Season (NOS). This summary should include, by timber sale, (a) number of days with operator activity on site (hauling, skidding, etc.), (b) number of days "shut down" - with no operations (temporary - within operational period), and (c) non-operational days (long, planned periods without activity).

Operational period are periods when the Purchaser indicates they plan to operate and logging equipment is in the sale area.

For example,

Timber Sale	Days w/operations	Days "shut down"	Non-operational days	NOS
Cub TS	40	10	100	May 1 - Nov 1
Jack TS	50	5	95	Apr 15 - Oct 15

[2] "Once-a-week" field visits during sale operational periods (outside the NOS). These monitoring/evaluation efforts would use quantitative measurements listed in BMP-WWO "Yardsticks" and Checklist (measures extracted from WWOS). Results of these visits would be reported using the WWO reporting spreadsheet (electronic version attached). Completed spreadsheets should be E-mailed to the SO (for Forest compilation) on the first working day of each month (outside the NOS). **Visits should be made only during operational periods.**

Selection of the day to make monitoring visit could be done in either of the following ways:

(1) **Randomly** - Beginning of each week, randomly select a day (roll dice, pick "days" from a

hat, ?), OR

(2) Use a **set rotation**, where monitoring is done every 4th day. Under this method, the entire monitoring period (operational periods outside the NOS) could be scheduled

ahead of time. For example under this method, monitoring visits would occur on Monday, Friday, (next) Monday, Friday, etc.

Monitoring visits would occur regardless of weather (wet days or dry days) or temporary shut downs.

We encourage timber administration personnel to involve other disciplines in WWO monitoring, specifically Engineering & Resources.

108 - Prosecution and Progress

108.00_nat_us_02_16_2005

108 Delete.

Delete Section 108 in its entirety.

109 - Measurement and Payment

109.00_nat_us_02_17_2005

109 Deletions

Delete the following entire subsections:

109.6 Pricing of Adjustments.

109.7 Eliminated Work.

109.8 Progress Payments.

109.9 Final Payment.

109.02_nat_us_06_16_2006

109.02 Measurement Terms and Definitions.

(b) Contract quantity.

Add the following:

Contract quantities will be adjusted only when there are errors in the original design of 15% or more.

Change the following:

“(b) Cubic yard” to “(c) Cubic yard”.

Add the following definition:

(p) Thousand Board Feet (Mbf). 1,000 board feet based on nominal widths, thickness, and extreme usable length of each piece of lumber or timber actually incorporated in the job. For glued laminated timber, 1,000 board feet based on actual width, thickness, and length of each piece actually incorporated in the job.

151 - Mobilization

151.01_0505_us_06_04_2007

151.01 Description

Add the following at the end of the last sentence:

Cleaning of Equipment for Noxious Weeds. To prevent the spread of noxious weeds on National Forest Land, Contractor shall ensure that all equipment moved onto National Forest Land is free of soil, seeds, vegetative matter or other debris that could contain or hold seeds. Contractor shall employ whatever cleaning methods necessary to ensure compliance with the terms of this specification, and shall notify Forest Service prior to moving each piece of equipment onto National Forest land. Notification will include identifying the location of the equipment's most recent operations. Upon request of the Forest Service, arrangements will be made for the Forest Service to inspect each piece of equipment prior to it being placed into service. If the Engineer determines that noxious weeds are present in a project, cleaning may also be required before moving between work areas within the same project.

Contractor shall certify, in writing, compliance with the terms of this specification prior to each start-up of operations. Measures taken to ensure compliance for equipment present at start-up, and planned to be taken for equipment to be moved in later, will be identified in the certification. For the purposes of this specification, "equipment" includes all machinery except for log trucks, chip vans, pickup trucks, cars, or other vehicles used to transport personnel on a daily basis.

Cleaning of Equipment for Port-Orford Cedar. To prevent the spread of *Phytophthora lateralis* root rot in Port-Orford cedar, Contractor shall clean before use in Project Area any vehicles or equipment from the natural range of Port-Orford cedar in Oregon or the Smith River and Bluff Creek drainage in California. Cleaning shall consist of the removal of soil by steam cleaning or use of a high pressure hose. Cleaning shall be inspected and approved by the Forest Service.

155 - Schedules for Construction Contracts

155.00_nat_us_05_11_2004

155 Delete.

Delete Section 155 in its entirety.

156 - Public Traffic

156.03_0505_us_01_20_2011

156.3 Accommodating Traffic During Work

Delete the first paragraph and add the following:

Contractor may close the following existing roads to all but emergency traffic in accordance with the following requirements:

Road Number	Maximum Time of Closure	Special Requirements
45N60	8 Hours	

All traffic controls and signing shall meet the requirements of the current edition of the MUTCD, Section 635, and this Section.

156.4 Maintaining Roadways During Work

Delete the first paragraph and add the following:

Abate dust on all roads used for hauling construction materials to promote safe use of and to prevent excessive loss of road material.

If water is used for dust abatement, complete abatement once for each hauling day shall satisfy this requirement; except that if hauling exceeds 10 loads per day, water shall be applied to dusting roads continuously while hauling. Other products suitable for dust abatement may be used when authorized by the Contracting Officer.

All water drafting operations shall adhere to the "Water Drafting Specifications", developed by the National Marine Fish Service, August 2001.

(<http://swr.ucsd.edu/hcd/WaterDrafting-02.htm>)

If other major users are using roads simultaneously with Contractor, Contractor and said users shall agree on a maintenance plan and arrangements for accomplishing the work. This plan shall be submitted by the Contractor and approved by the Contracting Officer. If Contractor cannot agree with other users, the Contracting Officer will determine the appropriate road maintenance needed and direct the Contractor to perform his share of the work..

156.08_nat_us_02_24_2005

156.08 Traffic and Safety Supervisor.

Delete this subsection in its entirety.

157 - Soil Erosion Control

157.03_0505_us_06_04_2007

157.03 General.

Delete the first two paragraphs and add the following:

Submit an Erosion Control Plan, including a comprehensive de-watering plan, detailing permanent and temporary control measures to minimize erosion and sedimentation during and after construction according to the contract specifications, contract permits, Section 107, and this Section. Contract permits amend the requirements of this Section. Do not modify the type, size, or location of any control or practice without approval. Submit the erosion control plan proposal at least 7 days before operations begin to the Contracting Officer for approval.

Add to the third paragraph:

Upon completion of construction at the site, all temporary dewatering materials and equipment are to be removed from Government property.

170 - Develop Water Supply and Watering

170.00_nat_us_03_30_2005

Description

170.1 This work consists of developing an acceptable water supply, furnishing, hauling, and applying water.

Materials

170.2 Conform to the following subsection.

Water	725.01.
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Construction Requirements

170.3 Development of Supply & Access. Develop water supplies and access to the water supplies as required. Use designated water sources or other approved water sources. Before using non-designated water sources, obtain all necessary permissions, water rights, and permits.

Existing water drafting sites are approved for use at locations where impacts to anadromous fish species and other beneficial water uses will not be adversely affected. Only these water sources may be used.

Existing water drafting sites that do not meet specifications will not be used or will be upgraded with rock surfacing, straw bales, or containment dikes prior to use .

All water drafting vehicles shall be checked daily and shall be repaired as necessary to prevent leaks of petroleum products from entering Riparian Reserves.

All water drafting vehicles shall contain petroleum absorbent pads, placed under vehicles before drafting.

Water will be drafted in accordance with NOAA Fisheries 2001 Water Drafting Specifications designed to avoid adverse effects to water quality and anadromous fish as follows:

a. When in habitat potentially occupied by Chinook and coho salmon, intakes will be screened with 3/32" mesh for rounded or square openings, or 1/16" mesh for slotted openings". When in habitat potentially occupied by steelhead trout, intakes will be screened with 1/8" mesh size.

b. Fish screen will be placed parallel to flow.

c. Pumping rate will not exceed 350 gallons per minute or 10% of the flow of the anadromous stream drafted from.

d. Pumping will be terminated when tank is full.

170.4 Equipment. Provide mobile watering equipment with watertight tanks of known capacity. Provide for positive control of water application from the driver's position.

170.5 Application. Apply water uniformly without ponding or washing.

170.6 Acceptance. Developing water supplies and watering will be evaluated under Subsections 106.02 and 106.04.

Measurement

170.7 Measure the Section 170 items listed in the bid schedule according to Subsection 109.02.

Payment

170.8 The accepted quantities will be paid at the contract price per unit of measurement for the Section 170 pay items listed in the bid schedule. Payment will be full compensation for the work prescribed in this Section. See Subsection 109.05.

201 - Clearing and Grubbing

201.01_nat_us_02_18_2005

201.01 Description

Replace with the following

This work consists of clearing and grubbing within clearing limits and other designated areas.

201.04_nat_us_02_22_2005

201.04 Clearing. (c)

Delete paragraph (c) and replace with the following:

(c) In areas outside the excavation, embankment, and slope rounding limits, cut stumps to within 12 inches or one-third of the stump diameter of the ground, whichever is higher, measured on the side adjacent to the highest ground. For timber sales, stump heights will meet the requirements of the Timber Sale contract.

201.04 Clearing.

Delete subsection (d) and replace with the following:

(d) Do not cut vegetation less than 3 feet tall and less than 3 inches in diameter, that is within the clearing limits but beyond the roadway and not in a decking area, and that does not interfere with sight distance along the road.

Add the following:

(e) Trim branches of remaining trees or shrubs to give a clear height of 14 feet above the roadbed unless otherwise indicated. Trim tree limbs as near flush with the trunk as practicable.

(f) Remove brush from log decks. Deck logs so that logs are piled parallel to one another; can be removed by standard log loading equipment; will not damage standing trees; will not interfere with drainage, and will not roll. Keep logs in log decks free of brush and soil.

201.06_nat_us_11_09_2005

201.06 Disposal

Delete the first sentence of this paragraph and substitute the following:

Limb and deck logs that meet utilization standards at locations approved by the CO or otherwise designated. Deck logs according to 201.04 (f).

203 - Removal of Structures and Obstructions

203.01_nat_us_02_25_2005

203.01 Description.

Delete and replace with the following:

This work consists of disposing of construction slash and debris, salvaging, removing, and disposing of buildings, fences, structures, pavements, culverts, utilities, curbs, sidewalks, and other obstructions.

203.05_nat_us_02_18_2005

203.05 Disposing of Material.

Add the following:

(e) Windrowing Construction Slash. Place construction slash outside the roadway in neat, compacted windrows approximately parallel to and along the toeline of embankment slopes. Do not permit the top of the windrows to extend above subgrade. Use construction equipment to matt down all material in a windrow to form a compact and uniform pile. Construct breaks of at least 15 feet at least every 200 feet in a windrow. Do not place windrows against trees. Obtain approval for pioneer roads. A pioneer road may be constructed to provide an area for placement of windrows, provided the excavated material is kept within the clearing limits and does not adversely affect the road construction.

(f) Scattering. Scatter construction slash outside the clearing limits without damaging trees. Limb all logs. Place logs and stumps away from trees, positioned so they will not roll, and are not on top of one another. Limb and scatter other construction slash to reduce slash concentrations.

(g) Chipping or Grinding. Use an approved chipping machine to grind slash and stumps greater than 3 inches in diameter and longer than 3 feet. Deposit chips or ground woody material on embankment slopes or outside the roadway to a loose depth less than 6 inches. Minor amounts of chips or ground woody material may be permitted within the roadway if they are thoroughly mixed with soil and do not form a layer.

(h) Debris Mat. Use tree limbs, tops, cull logs, split stumps, wood chunks, and other debris to form a mat upon which construction equipment is operated. Place stumps upside down and blend stumps into the mat.

(i) Decking Firewood Material. Remove brush from decks. Limb and deck logs that do not meet Utilization Standards according to Subsection 201.04 as directed by the CO. Cut logs to lengths less than 30 feet. Ensure that logs stacks are stable and free of brush and soil.

(j) Removal to designated locations. Remove construction slash to designated locations.

(k) Piling. Pile construction slash in designated areas. Place and construct piles so that if the piles are burned, the burning will not damage remaining trees. Keep piles free of dirt from stumps. Cut unmerchantable logs into lengths of less than 20 feet.

(l) Placing Slash on Embankment Slopes. Place construction slash on completed embankment slopes to reduce soil erosion. Place construction slash as flat as practicable on the completed slope. Do not place slash closer than 2 feet below subgrade. Priority for use of available slash is for: (1) through fills; (2) insides of curves; and (3) ditch relief outlets.

(m) Hydrological Sensitive Placement. Where required use this method in combination with other designated methods to dispose of material to reduce erosion and to aid in re-vegetation:

1. Place windrow segments on contours, wrap in type I geotextile.
2. Place logs as log erosion barriers on contours. Place logs so that 80% of their length is on the ground surface.
3. Scatter slash on bare or disturbed areas within or outside the clearing limits as directed.
4. Scatter chips or ground woody material on bare or disturbed areas within or outside the clearing limits as directed.

Place stumps in swales or on sites to form planting pockets. Place windrow segments on contours, wrap in type I geotextile.

203.08_nat_us_02_24_2005

203.08 Payment

Add the following:

Disposal of construction slash will be compensated under the designated pay item in Section 201.

204 - Excavation and Embankment

204.00_nat_us_03_26_2009

Replace Section 204 in its entirety with the following:

Description

204.1 This work consists of excavating material and constructing embankments. This includes furnishing, hauling, stockpiling, placing, disposing, sloping, shaping, compacting, and finishing earthen and rocky material.

204.2 Definitions.

(a) Excavation. Excavation consists of the following:

(1) Roadway excavation. All material excavated from within the right-of-way or easement areas, except subexcavation covered in (2) below and structure excavation covered in Sections 208 and 209. Roadway excavation includes all material encountered regardless of its nature or characteristics.

(2) Subexcavation. Material excavated from below subgrade elevation in cut sections or from below the original groundline in embankment sections. Subexcavation does not include the work required by Subsections 204.05, 204.06(b), and 204.06(c).

(3) Borrow excavation. Material used for embankment construction that is obtained from outside the roadway prism. Borrow excavation includes unclassified borrow, select borrow, and select topping.

(b) Embankment construction. Embankment construction consists of placing and compacting roadway or borrow excavation. This work includes:

- (1)** Preparing foundation for embankment;
- (2)** Constructing roadway embankments;
- (3)** Benching for side-hill embankments;
- (4)** Constructing dikes, ramps, mounds, and berms; and
- (5)** Backfilling subexcavated areas, holes, pits, and other depressions.

(c) Conserved topsoil. Excavated material conserved from the roadway excavation and embankment foundation areas that is suitable for growth of grass, cover crops, or native vegetation.

(d) Waste. Excess and unsuitable roadway excavation and subexcavation that cannot be used.

Material

204.3 Conform to the following Subsections:

Backfill material	704.03
Select borrow	704.07
Select topping	704.08
Topping	704.05
Unclassified borrow	704.06
Water	725.01

Construction Requirements

204.4 Preparation for Roadway Excavation and Embankment Construction. Clear the area of vegetation and obstructions according to Sections 201 and 203.

204.5 Reserved.

204.6 Roadway Excavation. Excavate as follows:

(a) General. Do not disturb material and vegetation outside the construction limits. Incorporate only suitable material into embankments. Replace any shortage of suitable material caused by premature disposal of roadway excavation. Dispose of unsuitable or excess excavation material according to Subsection 204.14.

At the end of each day's operations, shape to drain and compact the work area to a uniform cross-section. Eliminate all ruts and low spots that could hold water.

Retrieve material deposited outside of the clearing limits as directed by the CO. Place unsuitable material in designated areas.

(b) Rock cuts. Blast rock according to Section 205. Excavate rock cuts to 6 inches below subgrade within the roadbed limits. Backfill to subgrade with topping or with other suitable material. Compact the material according to Subsection 204.11

(c) Earth cuts. Scarify earth cuts to 6 inches below subgrade within the roadbed limits. Compact the scarified material according to Subsection 204.11.

(d) Pioneer Roads. Road pioneering, slash disposal, and grubbing of stumps may proceed concurrently with excavation. Conduct excavation and placement operations so material to be treated under Section 201 will not be incorporated into the roadway unless specified in the slash treatment method. Maintain drainage during pioneering operations.

Remove snow and ice in advance of the work and deposit beyond the roadway limits in a manner that will not waste material or generate sediment. Do not incorporate snow and ice into embankments. Place snow or ice in a manner to prevent resource damage.

204.7 Subexcavation. Excavate material to the limits designated by the CO. Take cross-sections according to Section 152. Prevent unsuitable material from becoming mixed with the backfill. Dispose of unsuitable material according to Subsection 204.14. Backfill the subexcavation with topping, or other suitable material. Compact the material according to Subsection 204.11.

204.8 Borrow Excavation. Use all suitable roadway excavation in embankment construction. Do not use borrow excavation when it results in excess roadway excavation. Deduct excess borrow excavation from the appropriate borrow excavation quantity.

Obtain borrow source acceptance according to Subsection 105.02. Develop and restore borrow sources according to Subsection 105.03. Do not excavate beyond the established limits. When applicable, shape the borrow source to permit accurate measurements when excavation is complete.

204.9 Preparing Foundation for Embankment Construction. Prepare foundation for embankment construction as follows:

(a) **Embankment less than 4 feet high over natural ground.** When designated, remove topsoil and break up the ground surface to a minimum depth of 6 inches by plowing or scarifying. Compact the ground surface according to Subsection 204.11.

(b) **Embankments over an existing asphalt, concrete, or gravel road surface.** Scarify gravel roads to a minimum depth of 6 inches. Scarify or pulverize asphalt and concrete roads to 6 inches below the pavement. Reduce all particles to a maximum size of 6 inches and produce a uniform material. Compact the surface according to Subsection 204.11.

(c) **Embankment across ground not capable of supporting equipment.** Dump successive loads of embankment material in a uniformly distributed layer to construct the lower portion of the embankment. Limit the layer thickness to the minimum depth necessary to support the equipment.

(d) **Embankment on an existing slope steeper than 1V:3H.** Cut horizontal benches in the existing slope to a sufficient width to accommodate placement and compaction operations and equipment. Bench the slope as the embankment is placed and compacted in layers. Begin each bench at the intersection of the original ground and the vertical cut of the previous bench.

204.10 Embankment Construction. Incorporate only suitable roadway excavation material into the embankment. When the supply of suitable roadway excavation is exhausted, furnish unclassified borrow to complete the embankment. Obtain written approval before beginning construction of embankments over 6 feet high at subgrade centerline. Construct embankments as follows:

(a) **General.** At the end of each day's operations, shape to drain and compact the embankment surface to a uniform cross-section. Eliminate all ruts and low spots that could hold water.

During all stages of construction, route and distribute hauling and leveling equipment over the width and length of each layer of material.

Compact embankment side slopes flatter than 1V:1.75H with a tamping type roller or by walking with a dozer. For slopes 1V:1.75H or steeper, compact the slopes as construction of the embankment progresses.

Where placing embankment on one side of abutments, wing walls, piers, or culvert headwalls, compact the material using methods that prevent excessive pressure against the structure.

Where placing embankment material on both sides of a concrete wall or box structure, conduct operations so compacted embankment material is at the same elevation on both sides of the structure.

Where structural pilings are placed in embankment locations, limit the maximum particle size to 4 inches.

(b) Embankment within the roadway prism. Place embankment material in horizontal layers not exceeding 12 inches in compacted thickness. Incorporate oversize boulders or rock fragments into the 12-inch layers by reducing them in size or placing them individually as required by (c) below. Compact each layer according to Subsection 204.11 before placing the next layer.

Material composed predominately of boulders or rock fragments too large for 12-inch layers may be placed in layers up to 24 inches thick. Incorporate oversize boulders or rock fragments into the 24-inch layer by reducing them in size or placing them individually according to (c) below. Place sufficient earth and smaller rocks to fill the voids. Compact each layer according to Subsection 204.11 before placing the next layer.

(c) Individual rock fragments and boulders. Place individual rock fragments and boulders greater than 24 inches in diameter as follows:

- (1) Reduce rock to less than 48 inches in the largest dimension.
- (2) Distribute rock within the embankment to prevent nesting.
- (3) Place layers of embankment material around each rock to a depth not greater than that permitted by (b) above. Fill all the voids between rocks.
- (4) Compact each layer according to Subsection 204.11 before placing the next layer.

(d) Embankment outside of roadway prism. Where placing embankment outside the staked roadway prism, place material in horizontal layers not exceeding 24 inches in compacted thickness. Compact each layer according to Subsection 204.11.

204.11 Compaction. Compact the embankment using one of the following methods as specified:

(a) Compaction A. Use AASHTO T 27 to determine the amount of material retained on a Number 4 sieve. If there is more than 80 percent retained on the No. 4 sieve use procedure (1).

If there is 50 to 80 percent retained on the No. 4 sieve use procedure (2). If there is less than 50 percent retained on the No. 4 sieve use procedure (3).

(1) Adjust the moisture content to a level suitable for compaction. Fill the interstices around rock with earth or other fine material as practical. Use compression-type rollers at speeds less than 6 feet per second and vibratory rollers at speeds less than 3 feet per second. Compact each layer of material full width with one of the following and until there is no visible evidence of further consolidation.

(a) Four roller passes of a vibratory roller having a minimum dynamic force of 40,000 pounds impact per vibration and a minimum frequency of 1000 vibrations per minute.

(b) Eight roller passes of a 20-ton compression-type roller.

(c) Eight roller passes of a vibratory roller having a minimum dynamic force of 30,000 pounds impact per vibration and a minimum frequency of 1000 vibrations per minute.

Increase the compactive effort for layers deeper than 12 inches as follows:

- For each additional 6 inches or fraction thereof, increase the number of roller passes in (a) above by four passes.
- For each additional 6 inches or fraction thereof, increase the number of roller passes in (b) and (c) above, by eight passes.

(2) Use AASHTO T 99 to determine the optimum moisture content of the portion of the material passing a No. 4 sieve. Multiply this number by the percentage of material passing a No. 4 sieve, and add 2 percent to determine the optimum moisture content of the material. Adjust the moisture content of material classified A-1 through A-5 to a moisture content suitable for compaction. Adjust the moisture content of material classified A-6 and A-7 to within 2 percent of the optimum moisture content.

Use compression-type rollers at speeds less than 6 feet per second and vibratory rollers at speeds less than 3 feet per second. Compact each layer of material full width according to (1) above.

(3) Classify the material according to AASHTO M 145. For material classified A-1 or A-2-4, determine the maximum density according to AASHTO T 180, method D. For other material classifications, determine the optimum moisture content and maximum density according to AASHTO T 99, method C.

Adjust the moisture content of material classified A-1 through A-5 to a moisture content suitable for compaction. Adjust the moisture content of material classified A-6 and A-7 to within 2 percent of the optimum moisture content.

Use compression-type or vibratory rollers. Compact each layer of material full width to at least 95 percent of the maximum density. Determine the in-place density and moisture content according to AASHTO T 310 or other approved test procedures. When required, use AASHTO T 224 to correct for coarse particles.

(b) Compaction B. Place material by end dumping to the minimum depth needed for operation of spreading equipment. Adjust the moisture content of the material to obtain a mass that will not visibly deflect under the load of the hauling and spreading equipment. Operate compaction equipment over the full width of each layer until there is no visible evidence of further consolidation or, if when a sheepsfoot roller is used, the roller “walks out” of the layer. Make at least three complete passes.

(c) Compaction C. Place material by end dumping to the minimum depth needed for operation of spreading equipment. Level and smooth each embankment layer before placing the next layers. Operate hauling and spreading equipment uniformly over the full width of each layer. Construct a solid embankment with adequate compaction by working smaller rock and fines in with the larger rocks to fill the voids, and by operating hauling and spreading equipment uniformly over the full width of each layer as the embankment is constructed.

204.12 Ditches. Slope, grade, and shape ditches. Remove all projecting roots, stumps, rock, or similar matter. Maintain all ditches in an open condition and free from leaves, sticks, and other debris.

Form furrow ditches by plowing or using other acceptable methods to produce a continuous furrow. Place all excavated material on the downhill side so the bottom of the ditch is approximately 18 inches below the crest of the loose material. Clean the ditch using a hand shovel, ditcher, or other suitable method. Shape to provide drainage without overflow.

204.13 Sloping, Shaping, and Finishing. Complete slopes, ditches, culverts, riprap, and other underground minor structures before placing aggregate courses. Slope, shape, and finish as follows:

(a) Sloping. Leave all earth slopes with uniform roughened surfaces, except as described in (b) below, with no noticeable break as viewed from the road. Except in solid rock, round tops and bottoms of all slopes including the slopes of drainage ditches. Round material overlaying solid rock to the extent practical. Scale all rock slopes. Slope rounding is not required on tolerance class D though M roads.

If a slide or slipout occurs on a cut or embankment slope, remove or replace the material, and repair or restore all damage to the work. Bench or key the slope to stabilize the slide. Reshape the cut or embankment slope to an acceptable condition.

(b) Stepped slopes. Where required by the contract, construct steps on slopes of $1\frac{1}{3}V:1H$ to $1V:2H$. Construct the steps approximately 18 inches high. Blend the steps into natural ground at the end of the cut. If the slope contains nonrippable rock outcrops, blend steps into the rock. Remove loose material found in transitional area. Except for removing large rocks that may fall, scaling stepped slopes is not required.

(c) Shaping. Shape the subgrade to a smooth surface and to the cross-section required. Shape slopes to gradually transition into slope adjustments without noticeable breaks. At the ends of

cuts and at intersections of cuts and embankments, adjust slopes in the horizontal and vertical planes to blend into each other or into the natural ground.

(d) Finishing. Finish the roadbed to be smooth and uniform, and shaped to conform to the typical sections. Remove unsuitable material from the roadbed and replace it with suitable material. Finish roadbeds to the tolerance class shown in table 204-2. Ensure that the subgrade is visibly moist during shaping and dressing. Scarify to 6 inches below the bottom of low sections, holes, cracks, or depressions and bring back to grade with suitable material. Maintain proper ditch drainage.

For surfaced roads, remove all material larger than 6 inches from the top 6 inches of the roadbed.

For unsurfaced roads, use one of the following methods to finish the roadbed:

- (1) **Method A.** Remove all material larger than 6 inches from the top 6 inches of the roadbed and replace with suitable material.
- (2) **Method B.** Use a vibratory grid roller or approved equal with a minimum weight of 10 tons. Roll at least 5 full-width passes or until there is no visible evidence of further consolidation.
- (3) **Method C.** For roads designated as Construction Tolerance Class K, L, or M, finish the roadbed by spreading the excavation. Eliminate rock berms.

204.14 Disposal of Unsuitable or Excess Material. Dispose of unsuitable or excess material at designated sites or legally off of the project.

When there is a pay item for waste, shape and compact the waste material in its final location. Do not mix clearing or other material not subject to payment with the waste material.

204.15 Acceptance. See Table 204-1 for sampling and testing requirements.

Material for embankment and conserved topsoil will be evaluated under Subsections 106.02 and 106.04.

Excavation and embankment construction will be evaluated under Subsections 106.02 and 106.04.

Clearing and removal of obstructions will be evaluated under Sections 201 and 203.

Measurement

204.16 Measure the Section 204 items listed in the bid schedule according to Subsection 109.02 and the following as applicable.

(a) Roadway excavation. Measure roadway excavation in its original position as follows:

- (1) Include the following volumes in roadway excavation:

- (a) Roadway prism excavation;
- (b) Rock material excavated and removed from below subgrade in cut sections;
- (c) Unsuitable material below subgrade and unsuitable material beneath embankment areas when a pay item for subexcavation is not shown in the bid schedule;
- (d) Ditches, except furrow ditches measured under a separate bid item;
- (e) Topsoil;
- (f) Borrow material used in the work when a pay item for borrow is not shown in the bid schedule;
- (g) Loose scattered rocks removed and placed as required within the roadway;
- (h) Conserved material taken from stockpiles and used in Section 204 work; and
- (i) Slide and slipout material not attributable to the Contractor's method of operation.

(2) Do not include the following in roadway excavation:

- (a) Overburden and other spoil material from borrow sources;
- (b) Overbreakage from the backslope in rock excavation;
- (c) Water or other liquid material;
- (d) Material used for purposes other than required;
- (e) Roadbed material scarified in place and not removed;
- (f) Material excavated when stepping cut slopes;
- (g) Material excavated when rounding cut slopes;
- (h) Preparing foundations for embankment construction;
- (i) Material excavated when benching for embankments;
- (j) Slide or slipout material attributable to the Contractor's method of operation;
- (k) Conserved material taken from stockpiles constructed at the option of the Contractor; and
- (l) Material excavated outside the established slope limits.

(3) When both roadway excavation and embankment construction pay items are shown in the bid schedule, measure the following as roadway excavation only:

- (a) Unsuitable material below subgrade in cuts and unsuitable material beneath embankment areas when a pay item for subexcavation is not shown in the bid schedule;
- (b) Slide and slipout material not attributable to the Contractor's method of operations; and
- (c) Drainage ditches, channel changes, and diversion ditches.

(b) Unclassified borrow, select borrow, and select topping. When measuring by the cubic yard measure in its original position. If borrow excavation is measured by the cubic yard in place, take initial cross-sections of the ground surface after stripping overburden. Upon completion of excavation and after the borrow source waste material is returned to the source, retake cross-sections before replacing the overburden.

Do not measure borrow excavation used in place of excess roadway excavation.

(c) Embankment construction. Measure embankment construction in its final position. Do not make deductions from the embankment construction quantity for the volume of minor structures.

(1) Include the following volumes in embankment construction:

- (a) Roadway embankments;
- (b) Material used to backfill subexcavated areas, holes, pits, and other depressions;
- (c) Material used to restore obliterated roadbeds to original contours; and
- (d) Material used for dikes, ramps, mounds, and berms.

(2) Do not include the following in embankment construction:

- (a) Preparing foundations for embankment construction;
- (b) Adjustments for subsidence or settlement of the embankment or of the foundation on which the embankment is placed; and
- (c) Material used to round fill slopes.

(d) Rounding cut slopes. Measure rounding cut slopes horizontally along the centerline of the roadway if a pay item for slope rounding is included in the bid schedule. If a pay item for slope rounding is not included in the bid schedule slope rounding will be considered subsidiary to excavation.

(e) Waste. Measure waste by the cubic yard in its final position. Take initial cross-sections of the ground surface after stripping over burden. Upon completion of the waste placement, retake cross-sections before replacing overburden.

(f) Slope scaling. Measure slope scaling by the cubic yard in the hauling vehicle.

Payment

204.17 The accepted quantities will be paid at the contract price per unit of measurement for the Section 204 pay items listed in the bid schedule. Payment will be full compensation for the work prescribed in this Section. See Subsection 109.05.

**Table 204-1
Sampling and Testing Requirements**

Material or Product	Type of Acceptance (Subsection)	Characteristic	Category	Test Methods Specifications	Sampling Frequency	Point of Sampling	Split Sample	Reporting Time
Topping (704.05) & unclassified borrow (704.06)	Measured and tested for conformance (106.04)	Classification	—	AASHTO M 145	1 per soil type	Processed material before incorporating in work	Yes, when requested	Before using in work
		Moisture- density	—	AASHTO T 180, method D ⁽¹⁾ or T 99, method C ⁽¹⁾	1 per soil type but not less than 1 per	“	“	“
		Compaction	—	AASHTO T 310 or other approved procedures	1 per 6000 yd ³ but not less than 1 per layer	In-place	—	Before placing next layer
Select borrow (704.07 & Select topping (704.08)	Measured and tested for conformance (106.04)	Classification	—	AASHTO M 145	1 per soil type but not less than 1 for each day of production	Processed material before incorporating	Yes, when requested	Before using in work
		Gradation	—	AASHTO T 27	“	“	“	“
		Liquid limit	—	AASHTO T 89	“	“	“	“
		Moisture- density	—	AASHTO T 180, method D ⁽¹⁾ or T 99, method C ⁽¹⁾	1 per soil type but not less than 1 per	“	“	“
		Compaction	—	AASHTO T 310 or other approved procedures	1 per 6000 yd ³ but not less than 1 per layer	In-place	—	Before placing next layer

(1) Minimum of 5 points per proctor

Table 204-1 (continued)
Sampling and Testing Requirements

Material or Product	Type of Acceptance (Subsection)	Characteristic	Category	Test Methods Specifications	Sampling Frequency	Point of Sampling	Split Sample	Reporting Time
Earth embankment (204.11, Compaction A)	Measured and tested for conformance (106.04)	Classification	—	AASHTO M 145	1 per soil type	Source of Material	Yes, when requested	Before using in work
		Moisture-density	—	AASHTO T 180, method D ⁽¹⁾ or T 99, method C ⁽¹⁾	1 per soil type but not less than 1 per 13,000 yd ³	“	“	“
		Compaction	—	AASHTO T 310 or other approved procedures	1 per 3500 yd ² but not less than 1 per layer	In-place	—	Before placing next layer
Top of subgrade (204.11 Compaction A)	Measured and tested for conformance (106.04)	Compaction	—	AASHTO T 310 or other approved procedures	1 per 2500 yd ²	In-place	—	Before placing next layer

(1) Minimum of 5 points per proctor.

**Table 204-2
Construction Tolerances**

	Tolerance Class ^(a)												
	A	B	C	D	E	F	G	H	I	J	K	L	M
Roadbed width (ft)	+0.5	+0.5	+1.0	+1.0	+1.0	+1.0	+1.5	+1.0	+2.0	+2.0	+2.0	+2.0	+2.0
Subgrade elevation (ft)	±0.1	±0.2	±0.2	±0.5	±0.5	±1.0	±1.0	±1.5	±2.0	±3.0	±2.0	±3.0	(c)
Centerline alignment (ft)	±0.2	±0.2	±0.5	±0.5	±1.0	±1.0	±1.5	±1.5	±2.0	±3.0	±3.0	±5.0	(c)
Slopes, excavation, and embankment (% slope ^(b))	±3	±5	±5	±5	±5	±5	±10	±10	±10	±10	±20	±20	±20

(a) Maximum allowable deviation from construction stakes and drawings.

(b) Maximum allowable deviation from staked slope measured from slope stakes or hinge points.

(c) Unless otherwise shown the centerline alignment and subgrade elevation, as built, have no horizontal curves with a radius of less than 80 feet, and no vertical curves with a curve length of less than 80 feet when the algebraic difference in the grade change is less than 10 percent, or a curve length of less than 100 feet when the algebraic difference of the grade change is greater than or equal to 10 percent. The centerline grade is not to exceed 20 percent in 100 feet of length.

204.11 Compaction.

Delete the first paragraph and replace it with the following:

For compaction according to method (a), (b), or (c), use AASHTO T 27 to determine the amount of material retained on a Number. 4 sieve. For compaction methods (d) or (e) no sieve test is required.

Add the following compaction methods:

(d) Layer Placement Method (Hauling and Spreading Equipment). Place material by end dumping to the minimum depth needed for operation of spreading equipment. Level and smooth each embankment layer before placing the next layers. Operate hauling and spreading equipment uniformly over the full width of each layer. Construct a solid embankment with adequate compaction by working smaller rock and fines in with the larger rocks to fill the voids, and by operating hauling and spreading equipment uniformly over the full width of each layer as the embankment is constructed.

(e) Layer Placement (Roller Compaction) Method. Place material by end dumping to the minimum depth needed for operation of spreading equipment. Adjust the moisture content of the material to obtain a mass that will not visibly deflect under the load of the hauling and spreading equipment. Operate compaction equipment over the full width of each layer until visible deformation of the layer ceases or, in when a sheepsfoot roller is used, the roller “walks out” of the layer. Make at least three complete passes.

204.13_nat_us_03_02_2005

204.13 Sloping, Shaping, and Finishing.

Delete section (d) and add the following:

(d) Finishing. For surfaced roads, remove all material larger than 6 inches from the top 6 inches of the roadbed. For all roads, finish the roadbed to be smooth and uniform, and shaped to conform to the typical sections. Remove unsuitable material from the roadbed and replace it with suitable material. Finish roadbeds to the tolerance class shown in table 204-2.

Ensure that the subgrade for both surfaced and unsurfaced roads is visibly moist during shaping and dressing. Scarify to 6 inches below the bottom of low sections, holes, cracks, or depressions and bring back to grade with suitable material. Maintain proper ditch drainage.

For unsurfaced roads, use one of the following methods to finish the roadbed:

(1) Method A. Remove all material larger than 6 inches from the top 6 inches of the roadbed and replace with suitable material.

(2) Method B. Use a vibratory grid roller or approved equal with a minimum weight of 10 tons. Roll at least 5 full-width passes or until visible displacement ceases.

(3) Method C. For roads designated as Construction Tolerance Class K, L, or M, finish the roadbed by spreading the excavation. Eliminate rock berms.

Add Table 204-2—Construction Tolerances:

Table 204-2 Construction tolerances.

	Tolerance Class ^(a)												
	A	B	C	D	E	F	G	H	I	J	K	L	M
Roadbed width (ft)	+0.5	+0.5	+1.0	+1.0	+1.0	+1.0	+1.5	+1.0	+2.0	+2.0	+2.0	+2.0	+2.0
Subgrade elevation (ft)	±0.1	±0.2	±0.2	±0.5	+0.5	±1.0	±1.0	±1.5	±2.0	±3.0	±2.0	±3.0	(c)
Centerline alignment (ft)	±0.2	±0.2	±0.5	±0.5	±1.0	±1.0	±1.5	±1.5	±2.0	±3.0	±3.0	±5.0	(c)
Slopes, excavation, and embankment (% slope ^(b))	±3	±5	±5	±5	±5	±5	±10	±10	±10	±10	±20	±20	±20

a. Maximum allowable deviation from construction stakes and drawings.

b. Maximum allowable deviation from staked slope measured from slope stakes or hinge points.

c. Unless otherwise shown the centerline alignment and subgrade elevation, as built, have no horizontal curves with a radius of less than 80 feet, and no vertical curves with a curve length of less than 80 feet when the algebraic difference in the grade change is less than 10 percent, or a curve length of less than 100 feet when the algebraic difference of the grade change is greater than or equal to 10 percent. The centerline grade is not to exceed 20 percent in 100 feet of length.

204.14_nat_us_03_02_2005

204.14 Disposal of Unsuitable or Excess Material.

Delete the text of the first paragraph and substitute the following:

Dispose of unsuitable or excess material at designated sites or legally off of the project.

251 - Riprap

251.03_nat_us_08_05_2009

Construction Requirements

251.03 General.

Add the following:

Place riprap under or adjacent to structures before placing prefabricated superstructure units or constructing superstructure falsework unless otherwise approved by the Forest Service.

251.08 Measurement.

Add the following:

Payment for excavation and embankment required for placement of riprap is indirectly included in the pay item for riprap.

301 - Untreated Aggregate Courses

301.00_nat_us_03_03_2005

301 Title Change.

Change the title to: **Section 301 Aggregate Courses**

301.01_nat_us_03_03_2005

301.01 Work.

Add the following:

Work includes producing aggregate by pit-run, grid rolling, screening, or crushing methods, or placing Government-furnished aggregate. Work may include additive mineral filler, or binder.

301.03_nat_us_09_14_2005

301.3 General.

Add the following:

Written approval of the roadbed is required before placing aggregate.

For pit run or grid-rolled material, furnish material smaller than the maximum size. No gradation other than maximum size will be required for pit-run or grid-rolled material. For grid rolling, use all suitable material that can be reduced to maximum size. After processing on the road, remove all oversize material from the road and dispose of it as directed by the Forest Service.

Provide additives or binder, if required, at the proportions specified.

Develop and use Government furnished sources according to Section 105.

If the aggregate is produced and stockpiled before placement, handle and stockpiled according to Section 320. Establish stockpile sites at locations approved. Clear and grub stockpile sites according to Section 201.

301.04_nat_us_03_03_2005

301.4 Mixing and Spreading.

Delete the first sentence of the first paragraph and add the following:

Ensure that aggregate and any required additives, water, mineral filler, and binder are mixed by the specified method except, if crushed aggregate products are being produced and mineral filler, binder, or additives are required, uniformly blend following crushing. Control additive proportions to 0.5 percent dry weight.

(a) Stationary Plant Method. Mix the aggregate with other required materials in an approved mixer. Add water during the mixing operation in the amount necessary to provide the moisture content for compacting to the specified density. After mixing, transport the aggregate to the jobsite while it contains the proper moisture content, and place it on the roadbed or base course using an aggregate spreader.

(b) Travel Plant Method. After placing the aggregate for each layer with an aggregate spreader or windrow-sizing device, uniformly mix it with other required materials using a traveling mixing plant. During mixing, add water to provide the necessary moisture content for compacting.

(c) Road Mix Method. After placing the aggregate for each layer, mix it with other required materials at the required moisture content until the mixture is uniform throughout. Mix aggregate, water, and all other materials until a uniform distribution is obtained.

Spread the aggregate in a uniform layer, with no segregation of size, and to a loose depth that will provide the required compacted thickness.

When placing aggregate over geotextile, place aggregate in a single lift to the full depth specified.

Route and distribute hauling and leveling equipment over the width and length of each layer.

301.05_nat_us_05_17_2005

301.5 Compacting

Delete and replace with the following:

Compact each layer full width. Roll from the sides to the center, parallel to the centerline of the road. Along curbs, headers, walls, and all places not accessible to the roller, compact the material with approved tampers or compactors.

Compact the aggregate using one of the following methods as specified:

Compaction A. Operating spreading and hauling equipment over the full width of the travelway.

Compaction B. Operate rollers and compact as specified in Subsection 204.11(a)(1).

Compaction C. Moisten or dry the aggregate to a uniform moisture content between 5 and 7 percent based on total dry weight of the mixture. Operate rollers and compact as specified in Subsection 204.11(a)(1).

Compaction D. Compact to a density of at least 95 percent of the maximum density, as determined by AASHTO T 99, method C or D.

Compaction E. Compact to a density of at least 96 percent of the maximum density, as determined by the Modified Marshall Hammer Compaction Method (available upon

request from USDA Forest Service, Regional Materials Engineering Center, P.O. Box 7669, Missoula, MT 59807).

Compaction F. Compact to a density of at least 95 per-cent of the maximum density, as determined by AASHTO T 180, method C or D.

Compaction G. Compact to a density of at least 100 percent of the maximum density as determined by the Modified Marshall Hammer Compaction Method (available upon request from USDA Forest Service, Regional Materials Engineering Center, P.O. Box 7669, Missoula, MT 59807).

For all compaction methods, blade the surface of each layer during the compaction operations to remove irregularities and produce a smooth, even surface. When a density requirement is specified, determine the in place density and moisture content according to AASHTO T 310 or other approved test procedures.

301.09_nat_us_07_07_2005

301.9 Measurement.

Replace the second paragraph with the following:

Measure aggregate by cubic yard compacted in place when payment is by contract quantities.

301.10_nat_us_03_03_2005

301.10 Payment

Delete the following:

adjusted according to Subsection 106.05

602 - Culverts and Drains

602.03_nat_us_09_06_2005

602.03 General.

Add the following:

Ensure that the final installed alignment of all pipe allows no reverse grades, and does not permit horizontal and vertical alignments to vary from a straight line drawn from center of inlet to center of outlet by more than 2 percent of pipe center length or 1.0 feet, whichever is less.

625 - Turf Establishment

625.00_0505_us_06_04_2007

625.3 General.

Delete this subsection and replace with the following:

Apply turf establishment to finished slopes and disturbed areas between September 1 and October 15. Seeded areas damaged by construction activities shall be reseeded within 10 days of the damage.

Do not seed during windy weather or when the ground is excessively wet, frozen, snow covered.

Assure that all seed and mulch used in the work conforms to the weed free requirements of Section 713.

625.4 Preparing Seedbed.

Delete entire subsection.

625.5 Watering

Delete entire subsection.

625.6 Fertilizing.

Delete entire section and replace with the following:

Fertilizer. Apply Ammonium phosphate fertilizer having a chemical analysis of 16-20-0 at the rate of 400 Lbs/acre.

(a) Dry Method. Apply the fertilizer with approved power driven seeders, drills, fertilizer spreaders or other mechanical equipment. Hand operated methods are satisfactory on areas inaccessible to mechanical equipment.

(b) Hydraulic method. Use hydraulic-type equipment capable of providing a uniform application using water as the carrying agent. Add fertilizer to the slurry and mix before adding seed.

625.7 Seeding.

Delete the first sentence and add the following.

Apply seed mix by the following methods.

(a) Dry method. Delete the third sentence and add the following:

When vegetative mulch is applied simultaneously with the seed mix and fertilizer, the seed and fertilizer shall be applied at the rates shown below. If vegetative mulch is applied after seeding and fertilizing, the seeding rate may be reduced by half but the fertilizer rate shall remain the same.

Add the following after subsection (b).

Seed Mix. Furnish and apply the following kinds of seed:

Seed Mixture

Quantity of

Seed (Lbs/Acre)

1. Luna pubescent wheatgrass	48
2. Crested wheatgrass	12
3. Rose clover	18
<hr/>	
Total	78

625.8 Mulching.

Delete the entire subsection and replace with the following:

Apply Mulch by the following methods.

(a) Dry Method. Apply mulch at a minimum rate of 3,000 pounds per acre.

(b) Hydraulic Method. Apply mulch in a separate application from the seed using hydraulic-type equipment according to Subsection 625.07(b).

Apply wood fiber or grass straw cellulose fiber mulch at a rate of 1,500 pounds per acre.

Apply bonded fiber matrix hydraulic mulch at a minimum rate of 3,000 pounds per acre. Apply so no hole in the matrix is greater than 0.04 inches. Apply so that no gaps exist between the matrix and the soil.

Mulch areas inaccessible to mulching equipment by hand. Apply mulch uniformly over the entire disturbed area.

Before the straw is obtained, Contractor shall furnish evidence that the mulch has been certified weed-free by the applicable County of State agency. Clearance shall be obtained from the County Agricultural Commissioner prior to the application of mulch to site.

625.9 Protecting and Caring for Seeded Areas

Delete the first sentence and add the following:

Protect and care for seeded areas until final acceptance.

625.11 Measurement.

Delete the entire Subsection and replace with the following:

Measure the Section 625 items listed in the bid schedule according to Subsection 109.02.

703 - Aggregate

703.05_nat_us_08_14_2009

Delete 703.05 and replace with the following:

703.5 Subbase, Base, Surface Course, and Screened Aggregate.

(a) Subbase or base aggregate. Furnish hard, durable particles or fragments of crushed stone, crushed slag, or crushed gravel conforming the following:

(1) Gradation	Table 703-2
(2) Liquid limit, AASHTO T 89	25 max.
(3) Plastic limit, AASHTO T 90	Nonplastic
(4) Los Angeles abrasion, AASHTO T 96	40% max.
(5) Sodium sulfate soundness loss (5 cycles), AASHTO T 104	12% max.
(6) Durability index (coarse), AASHTO T 210	35 min.
(7) Durability index (fine), AASHTO T 210	35 min.
(8) Fractured faces, ASTM D 5821	50% min.
(9) Free from organic matter and lumps or balls of clay	

Do not use material that breaks up when alternately frozen and thawed or wetted and dried.

Obtain the aggregate gradation by crushing, screening, and blending processes as necessary. Fine aggregate, material passing the No. 4 sieve, shall consist of natural or crushed sand and fine mineral particles.

(b) Surface course aggregate. Furnish hard, durable particles or fragments of crushed stone, crushed slag, or crushed gravel conforming the following:

(1) Gradation	Table 703-3
(2) Liquid limit, AASHTO T 89	35 max.
(3) Plastic Index, AASHTO T 90	
a) If the percent passing the No. 200 sieve is less than 12%	2 to 9
b) If the percent passing the No. 200 sieve is greater than 12%	Less than 2
(4) Los Angeles abrasion, AASHTO T 96	40% max.
(5) Sodium sulfate soundness loss (5 cycles), AASHTO T 104	12% max.
(6) Durability index (coarse), AASHTO T 210	35 min.
(7) Durability index (fine), AASHTO T 210	35 min.
(8) Fractured faces, ASTM D 5821	75% min.
(9) Free from organic matter and lumps or balls of clay	

Do not use material that breaks up when alternately frozen and thawed or wetted and dried.

Do not furnish material that contains asbestos fibers.

Obtain the aggregate gradation by crushing, screening, and blending processes as necessary. Fine aggregate, material passing the No. 4 sieve, shall consist of natural or crushed sand and fine mineral particles.

(c) **Screened aggregate** – Furnish hard, durable particles or fragments of stone, slag, or gravel conforming the following:

(1) Gradation	Table 703-16
(2) Plastic Index, AASHTO T 90	Less than 9
(3) Los Angeles abrasion, AASHTO T 96	55% max.
(4) Free from organic matter and lumps or balls of clay.	

Do not use material that breaks up when alternately frozen and thawed or wetted and dried.

Obtain the aggregate gradation by crushing, screening, and blending processes as necessary.

Delete Table 703-2 and replace with the following:

**Table 703-2
Target Value Ranges for Subbase and Base Gradation**

Sieve Size	Percent by Mass Passing Designated Sieve (AASHTO T 27 and T 11)				
	Grading Designation				
	A (Subbase)	B (Subbase)	C (Base)	D (Base)	E (Base)
2½ inch	100				
2 inch	97 – 100	100	100		
1½ inch		97 – 100			
1 inch	65 – 79 (6)		80 – 100 (6)	100	
¾ inch			64 – 94 (6)	86 – 100 (6)	100
½ inch	45 – 59 (7)				
⅜ inch			40 – 69 (6)	51 – 82 (6)	62 – 90 (6)
No. 4	28 – 42 (6)	40 – 60 (8)	31 – 54 (6)	36 – 64 (6)	36 – 74 (6)
No. 40	9 – 17 (4)			12 – 26 (4)	12 – 26 (4)
No. 200	4.0 – 8.0 (3)	4.0 – 12.0 (4)	4.0 – 7.0 (3)	4.0 – 7.0 (3)	4.0 – 7.0 (3)

() The value in the parentheses is the allowable deviation (±) from the target values..

Delete Table 703-3 and replace with the following:

**Table 703-3
Target Value Ranges for Surface Gradation**

Sieve Size	Percent by Mass Passing Designated Sieve (AASHTO T 27 and T 11)					
	Grading Designation					
	F	G	H	S	T	U
1 1/2 inch	100			100		
1 inch	97-100	100		72 – 92 (6)	100	
3/4 inch	76-89 (6)	97 - 100	97 - 100			100
1/2 inch					71 – 91 (6)	
3/8 inch	56-68 (6)	70 – 80 (6)	80 – 92 (6)	51 – 71 (6)		71 – 90 (6)
No. 4	43-53 (7)	51 – 63 (7)	58 – 70 (7)	36 – 53 (7)	43 – 60 (7)	50 – 68 (7)
No. 8				26 – 40 (6)	30 – 46 (6)	34 – 51 (6)
No. 16	23-32 (6)	28 – 39 (6)	28 – 40 (6)			
No. 40	15-23 (5)	19 – 27 (5)	16 – 26 (5)	14 – 25 (5)	16 – 28 (5)	19 – 30 (5)
No. 200	10.0-16.0 (4)	10.0 – 16.0 (4)	9.0 – 14.0 (4)	8.0 – 15.0 (4)	8.0 – 15.0 (4)	8.0 – 15.0 (4)

() The value in the parentheses is the allowable deviation (\pm) from the target values.
If the plasticity index (PI) is greater than 0, the TV range for the No. 200 sieve size is 8-12 (4).

Add Table 703-16:

Table 703-16

Gradation Requirements for Screened Aggregate

Sieve Size	Percent by Mass Passing Designated Sieve (AASHTO T 27 and T 11)						
	Grading Designation						
	L	M	N	O	P	Q	R
6 inch	100	100					
4 inch			100	100			
3 inch					100	100	
2 inch							100
No. 4		15-45		15-45		15-45	

713 - Roadside Improvement Material

713.04_0505_us_05_04_2007

713.04 Seed

Add the following to the end of the subsection:

If the manufacturer's instructions have not been specifically written for California, the rate of inoculation shall be four times that recommended by the manufacturer. In no case shall seed be inoculated more than three weeks before use under SECTION 625.

Seed shall be certified to be free of noxious weeds by the Siskiyou County Agricultural Commissioner.

718 - Traffic Signing and Marking Material

718.05_nat_us_08_05_2009

718.05 Aluminum Panels

Delete the third paragraph and replace with the following:

Clean, degrease and properly prepare the panels according to methods recommended by the sheeting manufacturer. Conversion coatings will conform to ASTM B-921 or ASTM B-449.